

US EPA ARCHIVE DOCUMENT

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Delphi Corporation,
Energy & Chassis Systems, and Safety & Interior Systems
Facility Address: 480 North Dixie Highway, and 250 Northwoods Blvd., Vandalia, OH
Facility EPA ID Nos: OHD 052 151 701, and OHD 000 048 454

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

 X If yes - check here and continue with #2 below.

 If no - re-evaluate existing data, or

 if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 2

2. Is **groundwater** known or reasonably suspected to be “contaminated”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

 X If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

 If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

 If unknown - skip to #8 and enter “IN” status code.

References:

- *Description of Current Conditions (Volumes I - IV)*. May 1999. Haley & Aldrich, Inc.
- *Progress Report, Third Quarter 2004*. October 15, 2004. Delphi Corporation.
- *RCRA Environmental Indicator Determination - CA750 Report Migration of Contaminated Groundwater Under Control*. November 2004. Haley & Aldrich, Inc.
- *RCRA Facility Investigation Field Event #3 Data Package*. November 24, 2004. Haley & Aldrich, Inc.

Rationale: Groundwater is monitored in three overburden (Water Table, First Sand, and Second Sand) and two bedrock (Top of Rock and Sugar Rock) units. Volatile organic chemicals (VOCs) exceeding maximum contaminant levels (MCLs) have been identified in each of the five units. The areal extent of contaminated groundwater in each unit has been mapped using groundwater chemistry data obtained from permanent monitoring wells and springs. Groundwater flow is generally to the east across the facility.

Water Table - The Water Table unit is generally within 5-feet of the surface but may be as deep as 10-feet. Five distinct areas wholly within the facility boundary have been mapped where contaminants at the Water Table exceed MCLs or risk-based equivalent drinking water levels (EDWLs). Figure 5 of the RFI Field Event #3 Data Package depicts the plume locations. Contaminants of concern exceeding their respective MCL or EDWL include 4-methyl-2-pentanone, 1,1-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), benzene, cis-1,2-DCE, ethylbenzene, manganese, methylene chloride (MC), tetrachloroethene, trichloroethene (TCE), vinyl chloride (VC), and xylenes. Monitoring wells located immediately downgradient of each plume define the extent of site contaminants migrating in the Water Table unit.

First Sand - The First Sand unit is discontinuous and generally one to three feet thick. The First Sand frequently merges into the Water Table unit. In the eastern portion of the facility, the First Sand converges into the deeper Second Sand unit. One large and seven small distinct areas wholly within the facility boundary have been mapped where contaminants in the First Sand unit exceed MCLs. Figure 7 of the RFI Field Event #3 Data Package depicts the plume locations. Contaminants of concern exceeding their respective MCL include 1,1-DCE, 1,1,1-TCA, benzene, cis-1,2-DCE, ethylbenzene, MC, TCE, VC, and xylenes. Monitoring wells located immediately downgradient of each plume define the extent of VOCs migrating in the First Sand unit. In some instances, the plumes are interpreted to end due to the First Sand unit no longer being present or that the First Sand merges with the Second Sand and the Second Sand monitoring wells define the extent.

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 3

Second Sand - The Second Sand unit is generally one to three feet thick, however multiple sand layers can span nearly 10-feet in thickness. Three distinct areas wholly within the facility boundary have been mapped where contaminants in groundwater exceed MCLs. In the case of the larger northern plume, monitoring wells located outside of the industrialized area but within the facility boundary are used to map the northern extent. Figure 9 of the RFI Field Event #3 Data Package depicts the plume locations. Contaminants of concern exceeding their respective MCL include cis-1,2-DCE, trans-1,2-DCE, TCE, and VC. Monitoring wells located immediately downgradient of each plume define the extent of VOCs migrating in the Second Sand unit.

Top of Rock - The Top of Rock unit is the fractured and weathered upper Dayton Dolomite and unconsolidated sand, gravel, cobbles, and boulders which directly overlie the bedrock. The location of Top of Rock monitoring wells at the facility are depicted in Figure 2 of the Progress Report, Third Quarter 2004. The most recent groundwater data for these wells is presented in Table 2 of the Progress Report. A VOC plume is located in a line extending through monitoring wells MW-428S, MW-422S, MW-424S, and MW-425S. These monitoring wells are located in the area of an abandoned production well that appears to have acted as a conduit for downward contaminant migration from the overburden into the bedrock. Contaminants of concern exceeding their respective MCL include 1,1,1-TCA, cis-1,2-DCE, MC, and TCE. Monitoring wells located immediately downgradient of the plume define the extent of VOCs migrating in the Top of Rock unit.

Sugar Rock - A deeper more permeable unit within bedrock of the lower Brassfield Formation and Belfast Transition Unit known as the "Sugar Rock" is the local aquifer tapped by private wells. An extensive groundwater contaminant plume is present in the Sugar Rock unit beneath the northeastern portion of the facility. It extends eastward and southeastward over one-mile where it discharges as springs from bedrock that outcrops along the western valley wall of the Great Miami River. Figure 7 of the Progress Report depicts TCE concentrations in the Sugar Rock unit. The most recent groundwater data for wells screened in the Sugar Rock unit is presented in Table 2 of the Progress Report. Along with TCE, contaminants of concern exceeding their respective MCL for drinking water include cis-1,2-DCE, MC, and VC.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"² as defined by the monitoring locations designated at the time of this determination)?

 X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"²).

 If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"²) - skip to

² "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 4

#8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

References:

- *Groundwater Monitoring Plan to Support the CA 750 Groundwater Environmental Indicator Determination.* June 2004. Haley & Aldrich, Inc.
- *Progress Reports, First Quarter 2002 to Third Quarter 2004.* Delphi Corporation.
- *Hydraulic Properties of the Elkhorn Shale.* November 5, 2004 Memorandum. Haley & Aldrich, Inc.
- *RCRA Environmental Indicator Determination - CA750 Report Migration of Contaminated Groundwater Under Control.* November 2004. Haley & Aldrich, Inc.

Rationale: Monitoring wells that support the stabilization of groundwater were selected in all five overburden and bedrock units. The monitoring wells and potentiometric surface for each unit are depicted in Figures 2, 3, 4, 5, and 6 of the RCRA CA 750 Environmental Indicator Determination report.

For the Water Table, First Sand, Second Sand, and Top of Rock units, groundwater data from the monitoring wells demonstrates that the various plumes are stable. For the Sugar Rock unit, groundwater data for monitoring wells located downgradient of the facility shows that MCLs are exceeded, even where the contaminated groundwater discharges from the Sugar Rock as springs. Eighteen (18) springs were sampled and three springs due east of the facility have TCE concentrations exceeding the MCL.

The defined areal extent of contamination in the Sugar Rock has remained consistent throughout the quarterly sampling program initiated in 2002. The extent of vertical migration in the Sugar Rock is bounded by the underlying Elkhorn Shale due to its hydraulic properties. The Elkhorn Shale acts as an aquitard which impedes contaminant transport.

Contaminated groundwater in the Sugar Rock unit is captured at the northeast corner of the facility by a groundwater migration control system which has been in operation since 2000. The system consists of a recovery well and air stripper. Recovery of contaminated groundwater from the overburden was initiated in December 2003. Approximately 500 pounds of VOCs are removed from groundwater each year. The groundwater migration control system effectively prevents the continuing off-site migration of contaminated groundwater from the facility. Groundwater data presented in the Delphi quarterly progress reports shows that VOC concentrations in the Sugar Rock unit downgradient of the groundwater migration control system are decreasing but remain above MCLs. At monitoring wells MW-411D and MW-412D located furthest east of the facility, TCE concentrations have decreased from over 2000 µg/l to about 500 µg/l during the last four years after startup of the groundwater migration control system.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

 X If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 5

References:

- *Progress Report, Third Quarter 2004*. October 15, 2004. Delphi Corporation.
- *RCRA Environmental Indicator Determination - CA750 Report Migration of Contaminated Groundwater Under Control*. November 2004. Haley & Aldrich, Inc.

Rationale: Groundwater from the Sugar Rock unit discharges to surface water. The Sugar Rock unit is exposed approximately one mile east of the facility at a bedrock escarpment. Springs have formed along the outcrop and flow east toward the Great Miami River. The most significant TCE concentrations identified in three springs due east of the facility range from 69 to 220 µg/l. Five other springs have minor (trace) amounts of TCE and/or cis-1,2-DCE present (see Figure 7 of RCRA CA 750 Environmental Indicator Determination report).

Contaminated groundwater in the overburden has historically infiltrated into the storm sewer system and discharged to an unnamed tributary of North Creek. However installation of a new water-tight storm sewer system and initiation of a groundwater migration control system for the overburden in December 2003 has significantly reduced the discharge of VOCs to the unnamed tributary of North Creek. The most recent surface water data shows only trace VOCs present at and immediately downstream of the storm sewer discharge point (see Table 4 and Figure 6 of the Progress Report, Third Quarter 2004). VOC concentrations do not exceed MCLs and are minor compared to the historical VOC concentrations found prior to the operation of the overburden groundwater migration control system in December 2003.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

X If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 6

the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

References:

- *Progress Report, Third Quarter 2004*. October 15, 2004. Delphi Corporation.
- *RCRA Environmental Indicator Determination - CA750 Report Migration of Contaminated Groundwater Under Control*. November 2004. Haley & Aldrich, Inc.

Rationale: The discharge of contaminated groundwater to surface water is considered potentially significant at the Sugar Rock springs because the level of TCE discharging into surface water is greater than 10 times the appropriate groundwater level. The MCL for TCE is 5 µg/l and TCE was most recently detected at 69, 220, and 220 µg/l at three springs, which is 14 to 44 times the appropriate groundwater level.

The discharge of contaminated groundwater into surface water at the unnamed tributary to North Creek is likely to be insignificant because the level of VOCs discharging to surface water are less than 10 times their appropriate groundwater level. In fact, recent data shows all concentrations less than their respective MCLs. VOC concentrations are expected to further decrease and be insignificant due to the initiation of the groundwater migration control system for the overburden in December 2003.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented)?

 X If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,⁵ appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 7

surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Reference:

- *RCRA Environmental Indicator Determination - CA750 Report Migration of Contaminated Groundwater Under Control*. November 2004. Haley & Aldrich, Inc.

Rationale: The discharge of contaminated groundwater to surface water at the Sugar Rock springs is currently acceptable based on the ecological assessment provided in Appendix A of the RCRA CA 750 Environmental Indicator Determination report.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

 X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Reference:

- *RCRA Environmental Indicator Determination - CA750 Report Migration of Contaminated Groundwater Under Control*. November 2004. Haley & Aldrich, Inc.

Rationale: Monitoring wells and surface water locations are proposed to be sampled quarterly or annually for VOCs (see Table 7 of RCRA CA 750 Environmental Indicator Determination report). The proposed monitoring program is appropriate with the following modifications:

- Add Sugar Rock springs B005 and B006 to the monitoring program;
- Add Sugar Rock monitoring wells MW-420D and MW-435D to monitor the plume interior and VOC chemistry; and
- For all Sugar Rock springs and monitoring wells proposed to be sampled for VOCs annually, modify the sampling frequency to semiannually.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 8

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

 X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Delphi Corporation - Vandalia Facility, EPA ID Nos. OHD 052 151 701 and OHD 000 048 454 located at Vandalia, Ohio. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

 NO - Unacceptable migration of contaminated groundwater is observed or expected.

 IN - More information is needed to make a determination.

Completed by (signature) Kenneth S. Bardo Date 12/28/04
(print) Kenneth S. Bardo
(title) Environmental Scientist

Supervisor (signature) George Hamper Date 12/28/04
(print) George Hamper
(title) Section Chief
(EPA Region or State) Region 5

Locations where References may be found:

RCRA 7th Floor File room - Administrative Record for RCRA 3008(h) Consent Order.

Contact telephone and e-mail numbers

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